Forest Service

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On October 2, 2008, I visited the Peaks Ranger District, Coconino NF, at the request of Andrew Stevenson to discuss and evaluate a forest health project within the Eastside Fuels Reduction and Forest Health project area on the District. I describe in this report existing stand conditions, what bark beetle activity was observed in this area, and make recommendations to minimize future bark beetle impacts.

Herold Ranch Units of Eastside Fuels Reduction & Forest Health Project

The Peaks Ranger District is planning to non-commercially thin a total 129 acres of ponderosa pine forest in Unit #4 of the Herold Ranch Units of the Eastside Fuels Reduction and Forest Health Project. This unit is adjacent to the Pine Canyon Golf Club and is located in the wildland urban interface (WUI) zone southeast of Flagstaff in Coconino County. The primary objectives for the 129 acres are to improve forest health, improve stand and individual tree resilience and vigor, reduce risk of catastrophic wildfire, and improve vegetative species diversity.

Proposed treatments include non-commercial thinning of ponderosa pine up to 9 inches in diameter; resulting in a residual basal area of less than 40-50 ft^2/acre where feasible. Activity slash <5 inches in diameter will be hand piled and burned at a later date. Slash >5 inches will be lopped and left on the site in forest openings. The proposed non-commercial thinning along with associated activity slash treatments would reduce the Fire Regime Condition Class for the treated sites from a Condition Class 3 or 2 to a Condition Class 1.

Andy and I evaluated this unit for general stand conditions and bark beetle activity. Forested area belonging to the state of Arizona is adjacent to the northern boundary of Unit 4. The state has previously thinned this area and slash piles were treated (***Figure 1***). The western boundary of the unit is bordered by the Pine Canyon Golf Club and residential area. A four chain wide strip of forest along this boundary was thinned by the Flagstaff Fire Department during the fall of 2007 and early summer 2008. Slash piles from both thinning time periods will likely be burned during this coming winter or spring. Although a small amount of successful brood production by pine engraver beetle (*Ips pini*) was observed in the slash generated in the fall of 2007, the slash was primarily utilized by coleopteran wood borers (Cerambycidae and Buprestidae). Much greater amounts of successful brood production of engraver beetles was observed in slash created in 2008; however, no mortality of residual pine trees was found.

Portions of the unit to be treated are dominated by dense stands of young ponderosa pine with scattered juniper in drier sites and ridge tops. Tree stems per acre range from 500 to 1,200 with predominantly 5 to 9 inches dbh trees. These areas have experienced low to moderate bark beetle-caused mortality over the past few years. Excess competition from smaller trees has also

greatly increased the risk of loss due to mortality of the scattered large yellow pine and large oak in the area. Continuous interlocking crowns and well-developed fuels ladders leaves vegetation on these sites at a high risk of loss from catastrophic wildfire.

The Herold Ranch Units project will increase both individual tree and stand health with residual trees being more resilient against attack from bark beetles and environmental stresses. Thinning around large yellow pines will reduce competition with smaller trees. The opening of tree canopies and the reduction of fuel ladders will reduce the risk of future crown fires.

Figure 1. *Dense stand conditions in Unit 4 of Herold Ranch adjacent to the Pine Canyon Golf Club (top left), previously treated ponderosa pine stand on Arizona state land to the north of Unit 4 (top right), and ponderosa pine stand treated along the western boundary of Unit 4 during the fall of 2007.*

Recommendations

The non-commercial thinning treatments within the Herold Ranch project area should reduce the overall susceptibility of stands to bark beetle attack in the long term as well as improve overall tree vigor, lessen risk of catastrophic wildfire, and improve vegetative species diversity. Activities proposed for the Herold Ranch area are covered under the Eastside Fuels Reduction and Forest Health Project Environmental Assessment. The decision notice for this project has been signed. Thinning for this unit is planned during the fall of 2009.

High stand density reduces both individual tree and stand vigor and therefore increases stand susceptibility to mortality from bark beetles (Fettig et al. 2007). Over the past several years, the Coconino NF has seen high levels of ponderosa pine mortality, particularly in the ponderosa/pinyon-juniper transition zones that is characteristic of the proposed treatment areas. Excess competition from smaller trees has also greatly increased the mortality risk of scattered

large yellow pine. Also, continuous interlocking crowns and well-developed fuels ladders leaves vegetation on these sites at a high risk of loss from catastrophic wildfire.

Thinning from below has been experimentally demonstrated to increase the resistance level of the residual mature pine overstory (Feeney et al. 1998, Kolb et al. 2007). However, thinning slash may pose a short-term risk to residual trees in the thinning units or surrounding areas depending on the timing of thinning, local population of pine engraver beetles, and site and environmental factors such as site quality and precipitation (Fettig et al. 2007). Careful monitoring of beetle populations associated with this thinning project should be implemented if slash is generated outside of the recommended thinning window of fall 2009. Several adjacent or nearby stands have had thinning and large amounts of activity slash were generated. This likely has resulted in increased pine engraver beetle populations in the area as evidenced by the high level of beetle brood production from slash created in 2008. DeGomez et al. (2008) provide guidelines for minimizing pine engraver beetle impacts associated with thinning treatments, such as thinning during periods of bark beetle flight inactivity.

If you have any questions regarding my assessment of the proposed project area or my recommendations, please let me know.

/s/ Joel D. McMillin
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